

REMARKS

This is in response to the office action mailed July 05, 2005. A Petition for a one month extension of time together with payment accompanies this response. A copy of the Petition and the check will be send by mail on the same day that this response is transmitted by facsimile to the Commissioner.

Claims 6 to 8 are now in this application. Claims 1 to 5 were previously cancelled without prejudice. Claims 7 and 8 have been amended to address a formal rejection noted by the Examiner. It is submitted that the amendments to the claims either place the application in order for allowance or clarify issues for appeal, and the Examiner is therefore requested to enter these amendments into the record.

35 U.S.C. 112, first paragraph, Rejection

Claims 6 to 8 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. However, there is clear disclosure that the pressure valve is located within the banjo bolt. See, for example, page 6, lines 25 to 27 which states that the "banjo bolt contains a pressure-regulating valve within it, which maintains a predefined pressure in the fuel injection pump 8".

Furthermore, the patent specification adequately and sufficiently describes the invention and the mode of its function. In the office action, the Examiner has specifically observed that there is no drawing to show how a pressure valve is located within the banjo bolt nor is the pressure valve shown so one can determine what type of pressure valve is being claimed. The Examiner further observes that the pressure relief opening is not shown or adequately described.

It is respectfully submitted that a banjo bolt with a spring loaded pressure regulating valve therein is commonly known to persons skilled in the art, especially for applications related to a fuel supply system of a diesel engine. Therefore, it is considered that no drawing or further details should be necessary in the patent specification of the present application, and that the specification in all respects meets the enablement requirements. A photograph of a commonly used Bosch make fuel injection pump is enclosed with this response, and it clearly depicts the banjo bolt containing a spring loaded pressure regulating valve.

As such, withdrawal of the rejection under 35 U.S.C. 112, first paragraph, is respectfully requested.

35 U.S.C. 112, second paragraph, Rejection

The Examiner's rejection of claims 7 and 8 is duly noted and amendments in this response address and overcome the rejection. As such, withdrawal of the rejection under 35 U.S.C. 112, second paragraph, is also respectfully requested.

35 U.S.C. 103(a) Rejection

Claims 6 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Betz in view of Channing '741. Claim 7 is rejected under the same provision as being unpatentable over Betz and Channing as applied in claim 6 and further in view of Constantine. The Examiner's rejections are respectfully traversed for the reasons set forth below.

The present invention claims a self-air bleeding fuel supply system for a diesel engine with a gravity primed fuel feed pump. None of the references cited and applied by the Examiner teach the construction of a self-air bleeding fuel supply system with a gravity primed fuel feed pump.

Betz describes a fuel system for a direct injection diesel engine vehicle having, among other parts, "a fuel priming line connected with said injection pump inlet, said priming line having an inlet with means to prevent fuel flow therethrough

unless opened; whereby the said fuel system may be reverse primed by pumping fuel through the priming line ... and avoiding the air locking of the system during the engine shut down" (see Claim 1).

It should be noted that the invention described and claimed in the present application does *not* function by way of any reverse priming.

Further, Betz states that a "small air bleed orifice 44 bypasses the pumping means and connects to the fuel outlet fitting 46 with a fuel return line 48 leading back to the fuel tank 12". In contrast, it may be noted that in the present invention, the microhole (orifice) is on the valve seat which automatically bleeds air from the fuel supply system.

Importantly, the placement of the opening or microhole in the presently claimed invention on the valve seat is not simply an obvious constructional change with respect to Betz as it does not perform a mere bypass function as is the case in Betz.

It is therefore submitted that the observation by the examiner, viz: "It would have been obvious to modify Betz by placing a regulator in the injection pump housing as taught by Channing, since it is almost always necessary to regulate either

fuel pump or injection pump pressure output" is not valid and is not supported by the references.

Therefore, it must be concluded that the opening or microhole in the presently claimed invention is constructionally and functionally distinctly different and non-obvious with respect to Betz and Channing.

With specific reference to claims 7 and 8, the patents cited and applied by the Examiner (Betz and Channing) clearly fail to teach:

"A self air bleeding fuel supply system as claimed in claim 6 wherein the fuel supply system is a gravity primed fuel system and in which the fuel feed pump is positioned below the level of the fuel tank." (Claim 7); and

"A self air bleeding fuel supply system as claimed in claim 6 wherein the pressure regulating valve having a valve seat with an opening is in the form of micro hole to allow the entrapped air to escape." (Claim 8).

Further General Technical Comments

The claimed invention, among other associate features, recites a patentable feature of the opening and/or microhole on

the valve seat. The microhole may be of any shape.

Additional salient differences between the invention claimed and the references cited by the Examiner are set forth below.

(1) The claimed invention is for self air bleeding fuel supply system, wherein air is bleeds automatically from entire fuel system, whereas Betz describes a reverse priming system for priming the fuel system, and the air bleeding is done by a mechanically openable check valve (56) with the help of manual intervention. Channing discloses the prevention of air ingestion of a fuel pump where a control unit [PCM/EEC (44)] senses the transfer pressure. When the transfer pressure drops below a predetermined pressure a controller disables the fuel injection pump. For the air bleeding, Channing provides and additional primer.

(2) The claimed invention is for a gravity primed system, in which a fuel feed pump (3) is located outside and below the fuel tank (1) position to facilitate gravity fuel flow from fuel tank to fuel feed pump. Betz has a pressurized fuel supply system, in which an electronically operated fuel feed pump (14) is located inside the fuel tank (12) and the entire fuel supply system is located above the fuel tank position, thus requiring

reverse priming.

Channing also has a pressurized fuel supply system in which an electronically operated fuel feed pump is located inside the fuel tank (16) and the fuel tank is located at the same level or below the fuel supply system, thus requiring reverse priming.

(3) In the presently claimed invention, no additional means is required for priming and for air bleeding. It is a *self-air* bleeding system, which automatically bleeds entrapped air from the entire fuel supply system through an opening which may be in the form of a micro-hole provided on the valve seat of the pressure regulating valve located in banjo bolt.

In the case of the Betz fuel supply system, reverse priming is necessary. A separate priming system consists of a priming line (54), a mechanically openable valve (56), a banjo bolt (50), and an air bleed orifice (44) on the priming means bypass line provided to facilitate reverse priming. For bleeding entrapped air from the fuel supply system, an operator has to **manually** open the valve (56) to allow air to escape. Manual or external intervention is *required* for both reverse priming and air bleeding. Hence the system does not automatically bleed entrapped air.

In case of the Channing fuel supply system, priming is necessary. A separate primer (28) is provided in the fuel supply system. For prevention of air ingestion through the fuel pump (36) and then bleeding the entrapped air from the system, a separate control unit [PCM/EEC (44)] is provided before fuel injector pump (36), which senses the transfer pressure. When the transfer pressure drops below a predetermined pressure, a controller disables the fuel injector pump. Subsequently, for bleeding air, provision has been made for an additional primer (28), as mentioned above. The invention detects the drop in transfer pressure in the system and disables the fuel injector pump (36).

(4) It must be appreciated that in the present invention, the novel and inventive construction described and claimed facilitates *self* air bleeding the fuel supply system with a gravity primed fuel feed pump to permit the automatic priming of fuel system. This is neither taught nor described in Betz, Channing, and/or Constantine, singly or in combination.

As such, favorable reconsideration of all of the claims and allowance of the application is respectfully requested.

If the Examiner has any questions, he is invited to contact

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the undersigned at telephone number (818)710-2788.

Please acknowledge safe receipt of this correspondence by stamping and returning the enclosed postcard.

Respectfully submitted,

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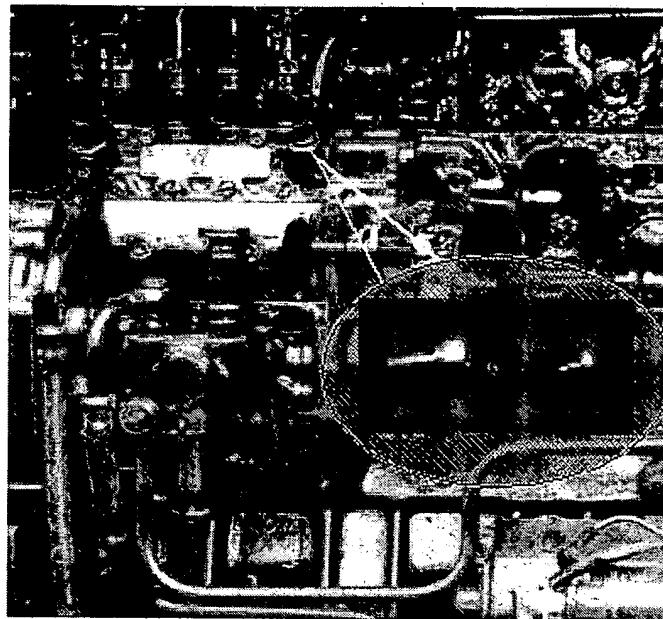
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I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner for Patents, P. O. Box 1450, Alexandria, VA 22313-1450, on November 4, 2005.

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This photograph shows a commonly used Bosch Fuel Injection Pump, which clearly depicts the Banjo bolt containing a spring loaded pressure regulating valve.

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